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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/820,735	03/30/2001	Yojiro Matsueda	109098	4744

25944 7590 01/15/2004

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EXAMINER

KOVALICK, VINCENT E

ART UNIT	PAPER NUMBER
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2673

DATE MAILED: 01/15/2004

27

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/820,735

Applicant(s)

MATSUEDA, YOJIRO

Examiner

Vincent E Kovalick

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 28 and 29 is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 9, 13-17, 19, 22-25 and 31-35 is/are rejected.
- 7) ☒ Claim(s) 5, 7, 8, 10-12, 18, 20, 21, 26, 27 and 30 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to Applicant's Amendment dated October 31, 2003 in response to USPTO Office Action dated July 31, 2003. The amendments to claims 1, 14 and 17 have been noted and entered in the record.

a). The rejection of claims 19 and 31-34 under 35 USC 112, first paragraph is herewith withdrawn in that the definition of "electro-optical conversion section" was sufficiently defined as set forth in para. 90 of the specification.

The objection to drawings is herewith withdrawn in that the "electro-optical conversion section" is shown in Fig. 7.

b). As was discussed at the interview of October 30, 2003, the primary issue became whether or not having the memory cell that drive the brightness levels of the dots being located adjacent to the dots as oppose to not being adjacent to the dots constituted novelty. After consulting with the PTO Technical staff, the PTO position is in that the placement of the memory cell adjacent to dots **does not** constitute novelty in that the practice of placing control logic or associated functional logic as close to the elements it is driving is well know and in common practice in the art.

c). Applicant's remarks relative to claims 1, 14 and 17 are rendered moot in that the argument addressed to claims 1, 14 and 17 is related to new limitations set forth in the current amendment, said limitations are addressed in the Office Action submitted herewith.

Regarding applicant's remarks relative to claim 2, applicant's remarks are not persuasive

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in light of the reasoning in item b) hereinabove.

Relative to applicant's remarks regarding claims 19 and 34 that Okumura et al. does not teach "electro-optical conversion", applicants remarks are not persuasive in that the image signal is supplied to the display panel where in turn it causes illumination of the pixel to the level corresponding to the incoming data signal (Okumura et al., col. 17, lines 23-55).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura et al. (USP 5,945,972).

Relative to claim 1, Okumura et al. **teaches** a display device, comprising: a plurality of write lines; a plurality of data lines; a plurality of dots disposed correspondingly to intersections between the plurality of write lines and the plurality of data lines, each of the plurality of dots that is minimum unit for displaying including (col. 17, lines 23-31 and Fig. 6): a storing section that stores a data signal to control display, the storing section having a memory cell configured by a static circuit and holding binary signals, and a number of the memory cells corresponding to a tonal level, a degree of the tonal level being determined by the data signal stored in the memory cells (col. 18, lines 27-41); and a display control section that performs display

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control on the basis of the digital data signal held by the storing section (col. 17, lines 23-35 and Figs. 3 and 9).

The difference between the teaching of claim 1 of the instant invention and that of Okumura et al. is that Okumura et al. does not specifically teach the storing section that stores a data signal to control the display being contained in the memory cell.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide to the device as taught by Okumura et al. the feature of including the storing section in the memory cell in order to make the said storing section more compact in that it would contain both the memory elements and the display elements in the same unit as opposed to having the means (logic and signal channels) to transport the tonal level data from a storage source not co-resident with the display element.

control on the basis of the digital data signal held by the storing section (col. 17, lines 23-38).

Relative to claims 31-32, Okumura et al. further **teach** said display device wherein each of the plurality of dots further comprises an electro-optical conversion section that performs an electro-optical conversion on the basis of a data signal supplied through a respective one of the plurality of data lines (col. 17, lines 23-55 and col. 18, lines 27-41 and Fig. 9).

Regarding claim 33, Okumura et al. **teaches** said display device wherein the electro-optical conversion section being a luminescent section (Abstract).

4. Claims 2, 3 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura et al. taken with Uragami et al. (USP 5,515,068).

Relative to claim 2, Okumura et al. **teaches** a display device comprising: a plurality of write lines; a plurality of data lines; a plurality of dots disposed correspondingly to intersections

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between the plurality of write lines and the plurality of data lines, each of the plurality of dots that is a minimum unit for displaying (col. 2, lines 37-56 and Fig. 2b), including a storing section storing a data signal when a write signal is transmitted through a respective one of the plurality of write lines (col. 12, lines 55-60; col. 18, lines 27-41 and Fig. 9).

Okumura et al. **does not teach** a converting section that converts a value based on a value of the data signal held by the storing section into an analog signal; and a display control section that performs tonal control on the basis of the analog signal converted by the converting section.

Okumura et al. teaches a display device including a substrate, a plurality of pixels arranged in rows and columns on the substrate and a plurality of signal lines for providing an image signal to the pixels on a column by column basis wherein each of the pixels comprises a plurality of memory elements for storing image signal sent over a corresponding one of the signal lines.

Uragami et al. **teaches** a semiconductor integrated circuit device to be utilized in a color palette device generating color pixel signals for a color display (col. 1, lines 64-67i and col. 2, lines 1-48); Uragami et al. further **teaches** a converting section that converts a value based on a value of the data signal held by the storing section into an analog signal (col. 5, lines 377-38 and col. 6, lines 32-37); and a display control section that performs tonal control on the basis of the analog signal converted by the converting section (col. 3, lines 44-67 and col. 4, lines 1-5).

Uragami et al. discloses an integrated circuit device capable of outputting analog color signal of digital color signals.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide to the device as taught by Okumura et al. the feature as taught by Uragami et al. in order to enable the system to drive an analog display device. It would have been further obvious to

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to a person of ordinary skill in the art at the time of the invention to incorporate the storing section and the converting section with the dots for the same reasoning as set forth relative to claim 1 in item 3 hereinabove.

Relative to claim 3, Okumura et al. further **teaches** said display device the at least one storing circuit including a memory cell configured by a static circuit (col. 18, lines 27-41 and Fig. 8).

Regarding claim 13, Uragami et al. further **teaches** said display device wherein the control section controlling light emission of current-driven luminescent devices in connection on the basis of the analog signal in place of performing tonal control using a liquid crystal, thereby effecting tonal control (col. 3, lines 44-67; col. 4, lines 1-5; col. 5, and col. 6, lines 32-37).

5. Claims 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura et al. taken with Uragami et al. as applied to claim 2 in item 4 hereinabove, and further in view of Matsueda et al. (USP 6,384,806).

Relative to claims 4 and 6, Okumura et al. taken with Uragami et al. **does not teach** a display device an analog signal being represented as a PWM waveform generated by the converting section; said converting section performing conversion into the analog signal at a constant period interval.

Okumura et al. taken with Uragami et al. teaches a display device including a substrate, a plurality of pixels arranged in rows and columns on the substrate and a plurality of signal lines for providing an image signal to the pixels on a column by column basis wherein each of the pixels comprises a plurality of memory elements for storing image signal sent over a corresponding one of the signal lines with a converting section that converts digital signals to

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corresponding analog signals with a display control section that performs tonal control on the basis of the analog signal.

Matsueda et al. **teaches** a digital driver circuit for electro-optical device and electro-optical device having the digital driver circuit (col. 2, lines 66-67; col. 3, lines 1-67; col. 4, lines 1-67; col. 5, lines 1-67; col. 6, lines 1-67 and col. 7, lines 1-48); Matsueda et al. further **teaches** a display device an analog signal being represented as a PWM waveform generated by the converting section; with said converting section performing conversion into the analog signal at a constant period interval (col. 8, lines 60-65 and col. 9, lines 4-27 and Abstract).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide the device of Okumura et al. taken with Uragami et al. with the DAC feature as taught by Matsueda et al. in order to generate an input signal compatible with analog driven display devices.

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura et al. taken with Uragami et al. in view of Matsueda et al.; as applied to claim 6 in item 5 hereinabove and further in view of Osada et al. (USP 5,973,456).

Relative to claim 9, Okumura et al. taken with Uragami et al. in view of Matsueda et al. **does not teach** said display device wherein alternating current drive voltage corresponding to the constant period being applied to said display control section.

Okumura et al. taken with Uragami et al. in view of Matsueda et al. teaches a display device including a substrate, a plurality of pixels arranged in rows and columns on the substrate and a plurality of signal lines for providing an image signal to the pixels on a column by column basis wherein each of the pixels comprises a plurality of memory elements for storing image signal

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sent over a corresponding one of the signal lines with a converting section that converts digital signals to corresponding analog signals with a display control section that performs tonal control on the basis of the analog signal.

Osada et al. **teaches** an electroluminescent display device having uniform display element column luminosity (col. 1, lines 61-67 and col. 2, lines 1-57); Osada et al. further **teaches** said display device wherein alternating current drive voltage corresponding to the constant period being applied to said display control section (col. 3, lines 12-22).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide to the device as taught by Okumura et al. taken with Uragami et al in view of Matsueda et al. with the feature as taught by Osada et al. in order to apply the alternating current to the display devices in a uniform time period.

7. Claims 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura et al. as applied to claim 1 in item 3 hereinabove, and further in view of Kimura (USP 6,518,941).

Regarding claims 14 and 17, Okumura et al. **does not teach** said display device having a luminescent section including a plurality of luminescent elements having different areas; and an active devices section connected to the storing section and the luminescent section.

Okumura et al. teaches a display device including a substrate, a plurality of pixels arranged in rows and columns on the substrate and a plurality of write lines and data lines for providing image signals to the pixels on a column by column basis wherein each of the pixels comprises a plurality of memory elements configured by a static circuit for storing image signal sent over a corresponding one of the data lines.

Kimura **teaches** a display device (col. 2, lines 19-67 and col. 3, lines 1-21); Kimura further

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teaches a luminescent section including a plurality of luminescent elements having different areas (col. 4, lines 7-11); and an active devices section connected to the storing section and the luminescent section (col. 2, lines 32-35; col. 3, lines 58-65 and Fig. 1).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide the device of Okumura et al. with the features as taught by Kimura in order provide luminescent elements with the means to provide different luminous intensity levels , and with the means to turn the luminescent elements ON/OFF by means of the said active element (TFT).

Regarding claims 15-16, Kimura **teaches** the said display device wherein the plurality of luminescent elements are organic EL elements (col. 4, lines 7-11).

8. Claims 19, 22-25 and 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura et al. as applied to claim 1 in item 3 hereinabove, and further in view of Hebiguchi et al. (USP 6,583,777) taken with Smith (USP 6,278,428).

Regarding claims 19, 34 and 35, Okumura et al. further teaches the plurality of dots including an electro-optical section that performs an electro-optical conversion on the basis of the data signal held by the storing section (col. 17, lines 23-55).

Relative to claims 19 and 34-35 Okumura et al. **does not teach** a display device comprising an active-matrix section having a plurality of dots disposed correspondingly to intersections of the plurality of write lines and the plurality of data lines; or a column decoder section that selects a data line of the plurality of data lines and a row decoder section that selects a row of the plurality of write lines through which a write signal is transmitted, the write signal being supplied to only a dot to be written of the plurality of dots.

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Okumura et al. teaches a display device including a substrate, a plurality of pixels arranged in rows and columns on the substrate and a plurality of write lines and data lines for providing image signals to the pixels on a column by column basis wherein each of the pixels comprises a plurality of memory elements configured by a static circuit for storing image signal sent over a corresponding one of the data lines.

Hebiguchi et al. **teaches** an active matrix type liquid crystal display device (col. 3, lines 5-67; col. 4, lines 1-67; col. 5, lines 1-67; col. 6, lines 1-67 and col. 7, lines 1-35); Hebiguchi et al. further **teaches** said display device comprising a plurality of write lines; a plurality of data lines an active-matrix section having a plurality of dots disposed correspondingly to intersections of the plurality of write lines and the plurality of data lines (col. 8, lines 50-67; and col. 19, lines 52-62).

It would have been obvious to a person of ordinary skill in the art at the time of the invention that to provide the device of Okumura et al. with the active matrix control elements as taught by Hebiguchi et al. in order to provide a ON/OFF control means to each of the matrix display elements.

Okumura et al. in view of Hebiguchi et al. **does not teach** a column decoder section that selects a data line of the plurality of data lines and a row decoder section that selects a row of the plurality of write lines through which a write signal is transmitted, the write signal being supplied to only a dot to be written of the plurality of dots.

Okamura et al. in view of Hebiguchi et al. teaches an active matrix display device including a substrate, a plurality of pixels arranged in rows and columns on the substrate and a plurality of write lines and data lines for providing image signals to the pixels on a column by column basis

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wherein each of the pixels comprises a plurality of memory elements configured by a static circuit for storing image signal sent over a corresponding one of the data lines. Smith discloses column and row decoders for a matrix display.

Smith **teaches** an active matrix liquid crystal display panel (col. 2, lines 52-67 and col. 3, lines 1-23); Smith further **teaches** a column decoder section that selects a data line of the plurality of data lines and a row decoder section that selects a row of the plurality of write lines through which a write signal is transmitted, the write signal being supplied to only a dot to be written of the plurality of dots (col. 3, lines 51-63; col. 5, lines 61-67; col. 6, lines 1-5 and Fig. 6).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide to the device as taught by Okumura et al in view of Hebiguchi et al. with the column and row decoder means in order to select the desired pixel to which a particular data signal is directed.

Regarding claim 22, Smith further **teaches** the said display device wherein the row decode section being allocated correspondingly to a length the active-matrix section in a column direction, and the column decoder section being allocated correspondingly to a length of the active-matrix section in a row direction. (Fig. 6).

Relative to claim 23, Smith further **teaches** the said display device further including a column selection switch section that transmits the data signal to a data line of the plurality of data lines selected by the column decoder section (col. 5, lines 6-20).

Regarding claims 24 and 25, Smith **teaches** the display device wherein the row decoder that selects a row of the plurality of write lines through which a write signal is transmitted on the

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basis of an address signal; and the column decoder section that selects a data line of the plurality of data lines on the basis of an address signal. It is well known and in common practice in the art that the display element location to which a data signal is directed is originated from the address signal associated with the data.

Allowable Subject Matter

9. Claims 5, 7-8, 10-12, 18, 20-21, 26-27 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 5, the major difference between the teachings of the prior art of record (USP 5,945,972, Okumura et al.), USP 5,515,068, Uragami et al., USP 6,518,941, Kimura ; USP 6,583,777, Hebiguchi et al. and USP 6,278,428, Smith) and that of the instant invention is that said prior art **does not teach** said display device comprising a converting section converting a signal to the analog signal including gamma-characteristics.

Regarding claim 7, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art **does not teach** said display device wherein a duration that no conversion into the analog signal is made being provided in the constant period.

Regarding claim 10, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art **does not teach** said display device wherein the alternating current drive voltage being a voltage driven at $V_{COM} \pm V_a$ with respect to a reference voltage V_{COM} .

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Regarding claim 11, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art **does not teach** said display device wherein the alternating current drive voltage being a voltage alternating-current-inversion-driven by two voltage-applying lines laid correspondingly to said dot array pattern.

Regarding claim 12, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art **does not teach** said display device wherein a plurality of rows of said dot array being provided by groups, and rows in pair being set in each of the groups to invert a phase of the alternating current drive voltage applied.

Regarding claim 18, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art **does not teach** said display device includes a plurality of read lines disposed correspondingly to the plurality of dots, read out of the data signal held by the storing section being performed when a read signal is transmitted through a respective one of the plurality of read lines.

Regarding claim 20, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art **does not teach** said display device wherein each of the plurality of dots further includes a converting section that converts a value based on a value of the data signal held by the storing section into an analog signal.

Regarding claim 21, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art **does not teach** said display device comprising a plurality of first lines for supplying a voltage as a power source to the storing section, the plurality of first lines being shared between two rows of the plurality of write signal lines.

Regarding claim 26, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art **does not teach** said display device including a plurality of pixels each of which being provided by three dots for red, green and blue, respectively, of the plurality of dots; the column decoder section selecting data lines of the plurality of data lines corresponding to a respective pixel of the plurality of pixels; and the data signal being supplied together to the three dots included in a respective one of the plurality of pixels.

Regarding claim 27, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art **does not teach** said display device including a plurality of pixels each of which being provided by three dots for red, green and blue, respectively, of the plurality of dots; the column decoder section selecting data lines of the plurality of data lines corresponding to respective pixels of the plurality of pixels; and the data signal being supplied together to the three dots included in the respective pixels.

Regarding claim 30, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art **does not teach** said display device wherein the column selection switch section being allocated correspondingly to a length of the active-matrix section in a row direction

10. Claims 28 and 29 are allowed.

11. The following is an examiner's statement of reasons for allowance:

Regarding claim 28, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art **does not teach** said display device comprising a substrate wherein the plurality of write lines, the plurality of data lines, the active-

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matrix section, the column decoder section, the row decoder section and the timing controller section being integrally formed on the substrate.

Regarding claim 29, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art **does not teach** said display device comprising a substrate wherein the plurality of write lines, the plurality of data lines, the active-matrix section, the column decoder section, the row decoder section and the memory controller section being integrally formed on the substrate.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U. S. Patent No.	6,388,661	Richards
U. S. Patent No.	6,323,867	Nookala et al.
U. S. Patent No.	6,258,606	Kovacs
U. S. Patent No.	6,064,158	Kishita et al.
U. S. Patent No.	5,841,897	Nulmakura et al.

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Responses

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vincent E Kovalick whose telephone number is 703 306-3020. The examiner can normally be reached on Monday-Thursday 7:30- 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala can be reached on 703 305-4938. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872-9314 for regular communications and 703 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 306-0377.



Vincent E. Kovalick
January 9, 2004



BIPIN SHALWALA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2000